

EXHIBIT P

Terra Money Twitter Thread, May 24, 2021.

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1/ Extreme volatility produced a series of collateral effects across the Terra ecosystem, primarily derived from the short-term peg deviation of \$UST and its impact on the volatility of \$LUNA and levers of the Terra protocol. There's a lot to unpack, so let's dive in

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2/ Let's start with the basics. The Terra protocol mechanism is quite simple:

When the supply of Terra stablecoins (like UST) goes up, the LUNA supply goes down.

When the supply of Terra stablecoins goes down, the LUNA supply goes up.

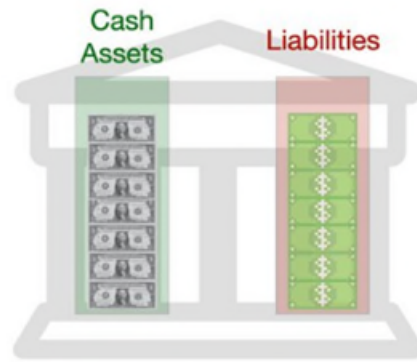
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3/ As an algorithmic stablecoin network, Terra is akin to a decentralized, open-source central bank.



Full Reserve Bank

medium.com

A Visual Explanation of Algorithmic Stablecoins

Stablecoin usage has exploded in the last year. And yet, fewer and fewer people seem to understand how these stablecoins actually work.

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4/ Assets (LUNA) and liabilities (UST) maintain parity by the Terra protocol acting as a market maker, inflating the LUNA supply during UST contractions and deflating the LUNA supply during UST expansions.



medium.com

Introducing the new Terra Protocol

Over the past few months we've been hard at work re-designing the Terra protocol.

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5/ Terra primarily achieves this via the on-chain swap mechanism that is baked into the protocol. Users can always go to protocol to swap \$1 worth of LUNA for 1 UST and vice versa. The system is designed to handle \$20 million of redemptions (UST → LUNA) with a 2% spread.

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6/The sharp price declines in LUNA were compounded by the sell-off of LUNA due to large amounts of liquidations on [@anchor_protocol](#). During the market volatility, redemptions from LUNA → UST exceeded \$80 million at times, forcing UST to trade at a discount on multiple venues.

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7/ This is primarily because the on-chain swap spreads inflated to 7 - 9% during the worst period, making the classic time-based arb opportunity fundamentally unprofitable on-chain since redemption slippage exceeded expected profits from the arbitrage.



THORChain @THORChain · May 24, 2021

UST dropping below the peg entices two arbitrage plays:

- 1) time-based arb (buy at 96c, wait to \$1, collect 4%)
- 2) "fast arb" - burn to LUNA, sell LUNA to USDT, buy back UST

(2) causes net sell of LUNA

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8/ On Terra, the time-based arb can be accomplished via the on-chain swap protocol rapidly and (during normal market conditions) profitably with minimal slippage. Users simply swap LUNA → UST (elevating peg pressure on UST) and wait for the peg to normalize to make a profit.

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9/ However, with swap spreads so large, the incentive to perform the time-based arb was curtailed significantly. At a spread of 500 - 700 bp for much of the day, the peg needed to be defended but the incentive to do so via the on-chain swap mechanism was low.

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10/ Additionally, the “fast arb” opportunity, where users swap UST → LUNA, sell LUNA to a stablecoin not trading at a discount (e.g., USDT, USDC), and then buyback UST amplified both the directional movement of LUNA’s sell-off and the widening of the swap spread.

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10/ LUNA's sharper price fall compared to other assets is a function of Anchor building up leverage on LUNA/bLUNA with cascading liquidations leading to market sells of LUNA -- fueling reflexive stress on the UST peg.

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11/ The “Death Spiral” of a bank run applied to Terra’s “seigniorage shares” style monetary policy is also not an apples-to-apples comparison.



Ariah Klages-Mundt @aklamun · May 23, 2021

The Terra UST stablecoin could collapse in a bank run effect. UST is backed by an endogenous collateral Luna. Current Luna marketcap has fallen to arguably < outstanding UST. We are now in a dangerous spiral: as users panic out of UST, this reinforces the Luna crash further.

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TerraUSD Chart



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12/ Yes, short-term reflexivity is a characteristic trade-off of algorithmic stablecoin designs, amplifying directional movements both ways, particularly during times of market stress and liquidity issues as investors rush for the exits.



insights.deribit.com

Stability, Elasticity, and Reflexivity: A Deep Dive into Algorithmic Stablecoins

In 2014, two academic papers were published: one by Ferdinando Ametrano called "Hayek Money: The Cryptocurrency Price Stability Solution," and another...

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13/ However, Terra is designed with explicit, real-time levers to combat the negative effects of endogenous collateral models (increasing tax rate on txs + cashflows to stakers) that traditional banking models cannot match.

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14/ Plagued by the cumbersome nature of stress-induced decision-making of human agents in times of market volatility, it's why central banks are exploring CBDCs. Algorithmic, calibrated adjustments of economic parameters are more effective than faxes and suits in meetings.

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15/ Currently, LUNA can easily shoulder the outstanding liabilities of UST, it just needs time to recalibrate and confidence restored -- something that will take more than a weekend.

 **THORChain** @THORChain · May 24, 2021

But how serious is it?

At 3.2% discount, (96.8c) the outstanding liability of the peg at this instant is
 $0.0032 * 1.99bn = \$64m$

\$64m is 3.3% of LUNA and 8% of daily LUNA volumes.

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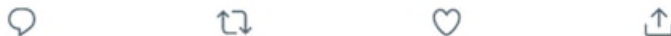
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16/ UST's demand is not a function of speculation like many other algo stables either. Instead, it serves as a lynchpin for the entire ecosystem, where the demand for using Terra envelops the demand for UST.

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17/ As long as we create useful applications that people use on top of Terra, a strong locus of demand will always exist.

THORChain @THORChain · May 24, 2021

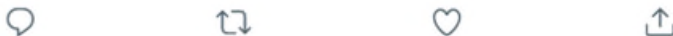
Unlike other stables which are coins with no demand centres, UST has a HUGE demand centre - being the settlement asset of Mirror and the earnings vault of Anchor.

So UST creates its own demand with its own economies.

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18/ And the use cases are already there. CHAI has more than 2 million active users in Korea, [@mirror_protocol](#) offers synthetic exposure to equities for people in financially disenfranchised regions, and Anchor continues to offer a high-yield savings vehicle.

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19/ Terra's protocol doesn't formulate explicit collateral of LUNA backing the outstanding liabilities of UST either. LUNA just gets rekt more if the outstanding supply of UST is larger than the assets (LUNA).

Ariah Klages-Mundt @aklamun · May 23, 2021

Is the system underwater? It's hard to say precisely. On paper, Luna FDV is still ~2x the 2b UST supply, but measures of circulating marketcap are only ~0.8x. Even the optimistic 2x number would be very unhealthy though given the spiral effect on endogenous collateral.

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Terra Chart






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20/ The protocol will keep arb opportunities open.
Even if the incentives to do so are dislocated during
ephemeral market turmoil, the incentives eventually re-
align and the system heals.

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21/ UST's discount and peg deviation are to be
expected in the short-term -- especially with the scale
of volatility experienced. It's the price that LUNA
stakers are willing to pay -- absorbing short-term
volatility based on longer time-horizons as investors
and supporters.

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22/ We just went through one insane market shock. But guess what? The peg is gradually normalizing again and will continue to do so as volatility subsides. Remember, volatility at this scale is ephemeral, not permanent.

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23/On-chain swap spreads are healing (ranging between 3 - 4%) as liquidations on Anchor wind down, arb opportunities on third-party venues incentivize buying UST, the market for LUNA becomes oversold and diamond hands, gloriously holding the line, glean a profitable opportunity.

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24/ The drawdown in the price of LUNA, UST peg deviation, and collateral effects across the ecosystem in such extreme market volatility is about as intense of a stress test in live conditions as can ever be expected. We just experienced a black swan.

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